

## SECTOR ASSESSMENT (SUMMARY): ENERGY (POWER)<sup>1</sup>

### Sector Road Map

#### 1. Sector Performance, Problems, and Opportunities

1. Bangladesh's gross domestic product grew at 6.6% in 2015 and is expected to grow at 6.7% in 2016 and 6.9% in 2017 due to several factors including the expansion of installed power and gas supply capacity and increased focus on energy access.<sup>2</sup> Rapid economic growth in 2006–2015 has resulted in an increase in electricity demand as the country industrializes and raises living standards while reducing poverty.

2. Notable improvements have taken place in the sector over the decade to 2016. Electrification rates rose from 35% in fiscal year (FY) 2003 to 72% in FY2016, while transmission and distribution losses were cut sharply, mainly through investment and better management.<sup>3</sup> The financial performance of most sector companies has improved because of higher tariffs, better collection, improved financial transparency, and increased metering. The operational performance of the power sector (measured by parameters such as total generation and gross revenues) has improved steadily since 1995. For instance, capacity addition in Bangladesh in both the public and private sectors more than doubled from the baseline in 2000. Losses have been reduced steadily since 1995 as a result of sector reforms, increased focus on distribution, and better commercial performance.

3. The power sector is supervised by the Power Division of the Ministry of Power, Energy and Mineral Resources, and regulated by the Bangladesh Energy Regulatory Commission (BERC). The sector has been unbundled into power generation, power transmission, and power distribution segments. The Bangladesh Power Development Board (BPDB) serves as the single buyer of all power generation and supplies power in bulk to the distribution utilities. The Ashuganj Power Station Company, Electricity Generation Company of Bangladesh, North-West Power Generation Company, and Rural Power Company are public sector generation companies. The power transmission segment is owned and managed by the Power Grid Company of Bangladesh Limited. The power distribution segment is managed by the BPDB (covering urban centers except Dhaka), the Dhaka Power Distribution Company and Dhaka Electric Supply Company (Dhaka City), the West Zone Power Distribution Company (Khulna), and the Bangladesh Rural Electrification Board covering the rest of the country.

4. The fuel mix of the country's installed power generation capacity<sup>4</sup> (May 2016) was 61.7% natural gas, 20.8% furnace oil, 8.6% diesel, 1.7% coal, 2.0% hydropower and 5.2% imported from India. Renewable energy comprises a negligible share but a target of 500 megawatts (MW) of installed capacity from solar power in 2012 was updated to 1,676 MW by 2021.<sup>5</sup>

5. **Demand and supply.** In 2015, the installed generating capacity was about 13,540 MW of which about 2,008 MW was captive power generation (power generated by a small power plant and consumed in the same location by an entity as an alternative to grid supplied power)

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<sup>1</sup> This summary is based on a power sector assessment for Bangladesh. Available on request.

<sup>2</sup> Asian Development Bank (ADB). 2016. *Asian Development Outlook 2016: Asia's Potential Growth*. Manila.

<sup>3</sup> Bangladesh's fiscal year ends on 30 June; FY2015 refers to the fiscal year ending on 30 June 2015. Data from the Ministry of Power Energy and Mineral Resources.

<sup>4</sup> Inclusive of power import capacity.

<sup>5</sup> Government of Bangladesh, Power Division. 2015. *Scaling-up Renewable Energy in Low Income Countries – Bangladesh Investment Plan*. Dhaka.

while about 11,532 MW was connected to the national grid. Over 5,250 MW is from private power plants under both long-term contracts (gas-fired) and short-term rental contracts (oil- and diesel-based).<sup>6</sup> Over 6,250 MW is provided by government-owned generation companies.<sup>7</sup> About 600 MW is purchased from India. The peak demand recorded was 9,036 MW in 2016. The transmission company received about 44,000 GWh of energy to be transmitted through the network in FY2014–2015 while sales to end-use customers were about 39,600 GWh.

6. **Increased focus on access to power.** Bangladesh has achieved rapid electrification, since 2003 and particularly since 2009 when the electrification ratio was 47%. This has now increased to about 72% in 2016. Improving access to electricity is a key objective of the government's Vision 2021<sup>8</sup> and will require significant investment in power transmission and distribution. There are significant regional differences: the western part of the country has traditionally been underserved, with power generation and transmission facilities concentrated in the east. The per capita electricity consumption, including estimated consumption from captive generation (including for industries), was 371 kWh (kilowatt-hour)<sup>9</sup> in FY2015, which is low compared with other countries in South Asia,<sup>10</sup> indicating significant capacity addition across the sector. The peak demand in Bangladesh is expected to increase due to the increasing customer base and through the increased demand from customers for household, commercial, and industrial activities, as well as the focus on export promotion zones and economic corridors. Several major power plants are expected to be operational by 2025 as indicated in the Power System Master Plan (PSMP)<sup>11</sup> and update under finalization in 2017.<sup>12</sup>

7. **Single fuel dependence and energy security.** Over 60% of the power generating capacity relies on gas as a fuel source. Gas supply shortages have impacted power generation and resulted in power cuts reducing economic output. The National Load Despatch Center has expressed concerns on managing the electricity grid given the low level of reserve capacity. To address shortages, the government has announced plans to (i) develop plants using dual fuel technology and domestic and imported thermal power, (ii) increase international power transfers, and (iii) promote solar and wind energy. Through a technical assistance (TA) grant, the Asian Development Bank (ADB) is supporting a review of options to improve energy security in Bangladesh.<sup>13</sup> Bangladesh is expanding the transmission ring network to cover a larger part of the country and increase reliability in case of faults.

8. **Dependence on rental power plants.** Rental power plants with short-term contracts use furnace oil, diesel, and fuel oil to supply over 2,500 MW of electricity to BPDB at a cost that

<sup>6</sup> Rental power plants were promoted by the government as a short term measure to rapidly deploy small capacity power plants based on liquid fuel to cope with critical shortage of power.

<sup>7</sup> Generation includes over 4,670 megawatts (MW) (Bangladesh Power Development Board) and 960 MW (Ashuganj Power Station Company).

<sup>8</sup> Government of Bangladesh, Ministry of Planning, Planning Commission. 2012. *Perspective Plan of Bangladesh 2010–2021: Making Vision 2021 a Reality*. Dhaka

<sup>9</sup> Government of Bangladesh, Ministry of Planning, Planning Commission. 2015. *7th Five Year Plan, FY2016–2020: Accelerating Growth, Empowering Citizens*. Dhaka. Electricity sales from the grid was 251 kWh/person in FY2015, as stated in the Annual Report, Bangladesh Power Development Board (BPDB), FY2015.

<sup>10</sup> Per capita consumption reported in 2015 by other countries in the region include about 1000 kWh/annum in India, about 540 kWh/annum in Sri Lanka and a world average of above 3,000 kWh/annum..

<sup>11</sup> Government of Bangladesh, Ministry of Power, Energy and Mineral Resources. 2011. *Power System Master Plan 2010*. Dhaka.

<sup>12</sup> The approved master plan indicates peak demand reaching 19 GW by 2021. The studies for the PSMP update indicate reaching this target may be delayed. These studies also indicate that the gap between existing generation projects and demand would cross 12 GW by 2025 signifying the need for significant investments in generation and transmission to meet incremental demand and replace high cost and inefficient generators.

<sup>13</sup> ADB. 2014. *Technical Assistance to People's Republic of Bangladesh for Study on Energy Security*. Manila.

is several times the average tariff that can be recovered from consumers. This is impacting power sector financials: in 2014, oil and diesel accounted for 18.3% of BPDB's power generation mix, but nearly 40.0% of BPDB's fuel and power purchase costs. The cost of electricity increased from Tk2.7/kWh in 2010 to Tk7.6/kWh in 2015. The electricity sector in 2014 required Tk61 billion in subsidy, a sharp increase from 2010 when the subsidy requirement was just Tk12 billion. Over the medium term, the introduction of an increasing share of thermal base load power generation would reduce the dependence on expensive liquid fuels and moderate the cost of electricity.

9. **Environment for investment.** The PSMP (footnote 11) outlined a target of raising the country's generation capacity to 24,000 MW by 2021 and 40,000 MW by 2030. This is currently under update. Major challenges include improving the business environment for power sector investments, operational issues such as ensuring fuel linkages and logistics, as well as addressing barriers to cost recovery and mobilization of local long-term financing. Implementing the power sector expansion plan will require significant public sector investment including through joint and private sector projects.

10. **Governance and planning.** Several power sector entities, including the Power Grid Company of Bangladesh and the Dhaka Electric Supply Company, are listed on the country's stock exchange. The government, through the Power Division of Ministry of Power, Energy and Mineral Resources, remains a majority shareholder and supervises the functioning of these entities. The corporatization of BPDB is not yet complete. The government has announced significant capacity addition plans to achieve the target of 100% access to electricity by 2021. This will require additional planning expertise to make the proposed plants operational and to procure power efficiently.

11. **Renewable energy and energy efficiency.** The government enacted the Sustainable and Renewable Energy Development Authority Act, 2012 to set up a coordinating agency for renewable energy and energy efficiency. Bangladesh has a successful off-grid solar program with over 3.6 million solar home systems and 135 MW of solar power capacity in operation. The government is considering solar-diesel hybrids and grid-connected solar power options. There is a focus on replacing old gas plants with combined cycle plants to boost energy efficiency. The Sustainable and Renewable Energy Development Authority is focusing on building codes and appliance labeling for efficiency targets.

12. **Tariffs and regulation.** The functions of the BERC include ensuring the efficient use of electricity, service quality, and tariff determination. While carrying out politically sensitive tariff reforms is challenging, retail tariffs have regularly increased since 2009. Important regulations for the power and gas sector, including tariff regulations are gazetted and applied. The electricity transmission and distribution tariff regulations (notified in June 2016) permit transmission and distribution utilities to approach the BERC for a review of tariffs on a periodic basis based on published principles. Existing retail electricity tariffs are considered inadequate given the proliferation of imported fuels (particularly heavy fuel oil and diesel). The changes in international fuel prices are not passed on in a periodic and predictable manner. The 30% decrease in the cost of imported fuels in March 2016 to reflect lowered international costs should result in a downward trajectory on the bulk supply and retail tariffs. Under the proposed project, capacity building support to the BERC is expected in the areas of tariff regulation implementation, loss studies, and energy audits.

13. **Regional power trading.** Bangladesh can benefit from this regional trading potential if political, legal, operational, regulatory, and technical issues are addressed in a timely manner.

In 2012, Bangladesh and India signed their first cross-border power purchase agreement for 250 MW and in 2016; power flows between the two countries are at 600 MW. With the commissioning of the second interconnection between Bangladesh and India in 2018, the trading would increase to 1,100 MW. The potential for additional cross-border transmission capacity and power trade with other South Asian countries, such as hydropower electricity from Bhutan and Nepal, is being discussed, including through joint ventures and the private sector.

## **2. Government's Sector Strategy**

14. To address Bangladesh's constrained economic growth and widespread poverty, the power sector development framework identifies the need to establish an adequate, reliable power supply, and to increase access to power. The government has set the goal of providing electricity to all citizens by 2021. To achieve this target and address emerging power sector challenges, significant investments in generation, transmission, and distribution are required. The government has estimated the need for \$40 billion of investments by 2030. This volume of investment must be anchored in significant regulatory and governance reforms, including fuel mix diversification, to overcome sector challenges as planned in the PSMP (footnote 11) for long-term energy security in Bangladesh.

15. Gas consumption will continue to increase, especially for electricity production, despite declining gas reserves. New commercially viable reserves are being developed, while the import of liquefied natural gas, including cross-border natural gas trading with India and Myanmar, could help fill the growing gap. In addition, cross-border power trading in the South Asian region with India is expected to increase, including potential power purchases from Nepal and Bhutan.

16. The government's power road map for 2010–2015 recognized the need to empower BERC to link tariffs and costs, improve the corporate governance of sector entities, complete the restructuring of BPDB, unbundle and grant managerial independence to sector entities, streamline the process for private sector investments, and mobilize funds from capital markets for the power sector entities.<sup>14</sup> While there has been some success, efforts are expected to continue. The draft PSMP update in 2016 brings out the need for greater coordination between the power sector master plan and the energy master plan and greater private investment in the generation sector. ADB continues to support through financing of projects, participation in the local consultative group (comprising various development partners), and its TA program.

## **3. ADB Sector Experience and Assistance Program**

17. ADB has been a key multilateral development partner in the power and energy sector in Bangladesh. Since 2001, ADB provided a total of \$4 billion (through 42 loans) in support of gas and power sector development by improving generation, transmission, and distribution infrastructure. Through TA projects, ADB is also supporting the assessment of options to increase capacity and energy security and create institutions for power trading.

18. The 2009 Sector Assistance Program Evaluation for Bangladesh Energy Sector noted that the operational, commercial, and financial performance of the transmission and distribution entities had improved.<sup>15</sup> Bill collections were better, the number of outages had been reduced, the voltage profile had improved, and cost recovery had improved.

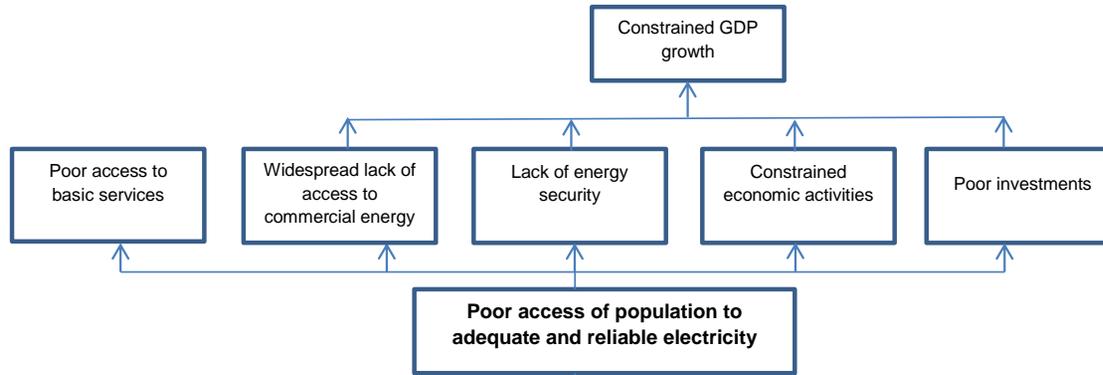
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<sup>14</sup> Government of Bangladesh, Ministry of Finance. 2010. *Towards Revamping Power and Energy Sector: A Road Map*. Dhaka.

<sup>15</sup> ADB. 2009. *Sector Assistance Program Evaluation for Bangladesh Energy Sector*. Manila.

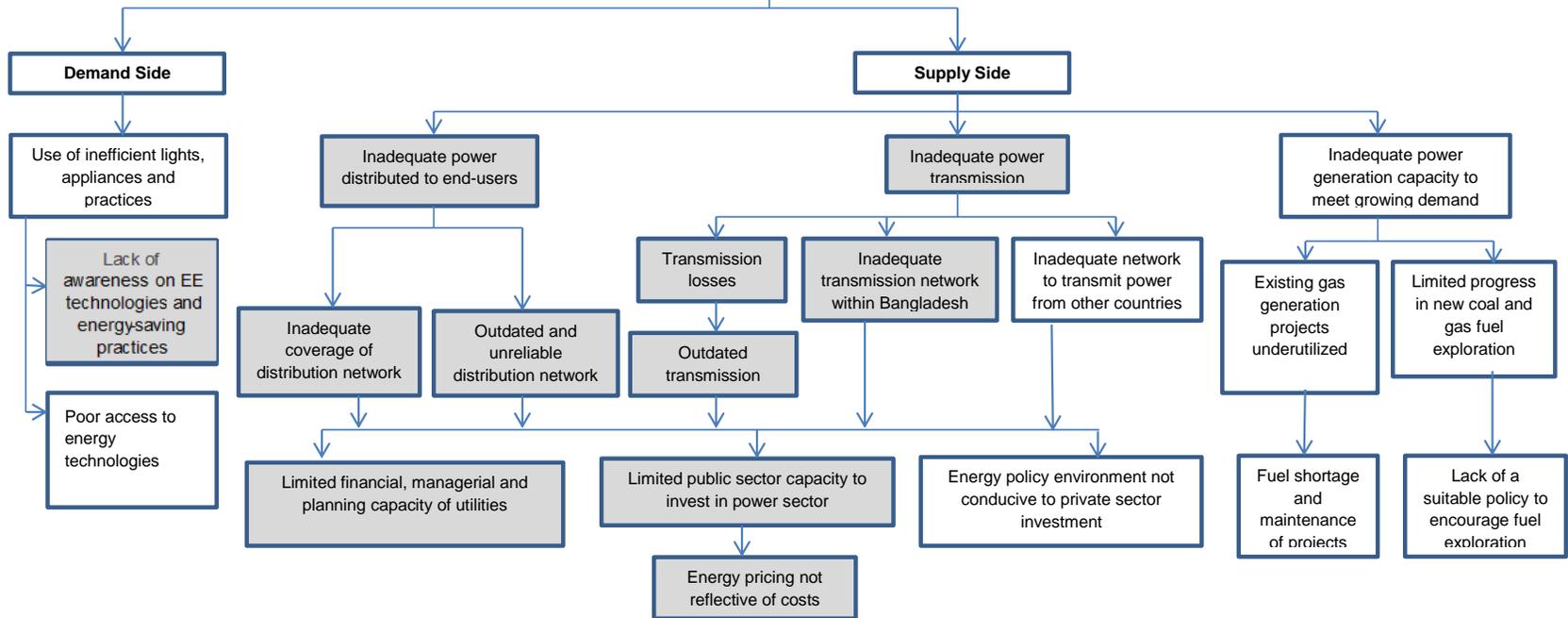
### Problem Tree for Power Sector in Bangladesh

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F  
F  
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CORE  
PROBLEM

C  
A  
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E  
S



- Project scope  
EE = energy efficiency.